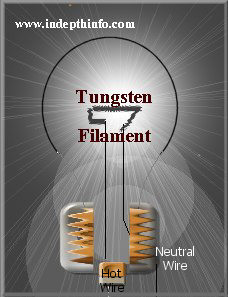
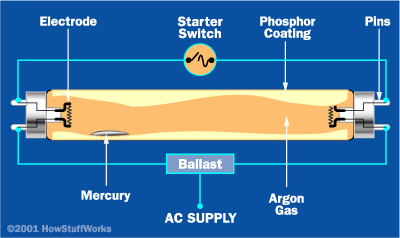
**INTRODUCTION TO ARTIFICIAL ILLUMINATION**

1. **Incandescent Bulbs**  
   An incandescent light is the normal bulb that was invented by Thomas Edison

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1. [Light](http://www.indepthinfo.com/gadgets/light-bulb.shtml) bulbs work on a very simple principle. When metal is heated, it glows! The only problem is that it has to be heated up a lot.
2. Electricity comes into a light bulb via a hot wire connected to a tab on the base of the bulb. Inside the bulb the electricity goes through a wire leading to a piece of tungsten. The tungsten is very [thin](http://www.indepthinfo.com/gadgets/light-bulb.shtml) and coiled to maximize resistance in the wire. When electricity meets resistance, it heats up the resistor.
3. The tungsten gets to a temperature of about 4500° [Fahrenheit](http://www.indepthinfo.com/temperature/fahrenheit.htm) (2482° [Celsius](http://www.indepthinfo.com/temperature/celsius.htm)). This causes it to get white hot. It glows, and glows quite brightly. Tungsten is used because it has a very high melting point.
4. The tungsten is encased in a bulb for good reason. Not only does it protect people and objects from the hot tungsten, it also keeps oxygen away from the hot metal, which would make it immediately burn up. The bulb is usually filled with a low pressure, inert gas such as argon.
5. **Fluorescent bulbs**

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1. A [fluorescent lamp](http://www.ccmr.cornell.edu/education/ask/index.html?quid=167) consists of a glass tube that is filled with mercury vapor at low pressure. The inside of the tube is coated with a phosphorous substance. Two coiled metal (tungsten) filaments are at each end of the tube. When an electric current flows through the filaments they start to get hot and glow (like a regular light bulb). When we apply a voltage between the two filaments and electrons get sucked from one filament to the other. While zipping through the tube, electrons crash into mercury atoms, which start to glow and send out ultra-violet (UV) light.
2. UV-light is very, very violet. Actually it is so violet that you can't see it, but you can get a sunburn from it. So on its own UV-light wouldn't make a useful lamp: that's why there is a phosphorous substance in the inside of the glass tube. When UV-light hits the phosphor atoms, they absorb the UV light and send out the white light that illuminates your room. The conversion of light from one type to another is called *fluorescence*, which gave the fluorescent lamp its name.
3. Fluorescent lights conserve energy. For the same amount of light they need less power than usual light bulbs
4. **“Neon” tubing**

 1.Neon is one of six inert gases including Helium, Xenon, Krypton and Argon and Radon. Inert gases tend to keep their molecular structure. What is interesting about them is that they remain inert only in chemical reactions...not in glass tubes with electrodes like [neon signs](http://www.indagloneon.com/).

1. The electrodes in a neon sign discharge a high voltage through the gas in the discharge tube. The voltage is increased by means of a type of transformer called a ballast. The voltage that shoots through the gas will speed up any free electrons, which in turn builds the kinetic energy in the tube. When the kinetic energy is high enough, the neon atom becomes ionized. Ionization happens with an electron either jumps up to the next electron orbit, or down to the next electron orbit. What ionization does is give an inert gas a positive or negative charge. That charge creates a plasma (sort of a superheated gas/liquid) that carries the electrical impulse from one end of the tube to the other. This completes the electrical circuit.
2. When the circuit is complete, the electrons that were "excited" fall to their regular energy level. When this occurs, a photon is emitted, creating the glowing light we are all familiar with. A photon is a light particle/wave (physicists are still up in the air about which it is), and as long as the photon is within our visible light spectrum we can see it. Each of the noble gases has a distinct color.
3. **High Pressure Sodium lamps**

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|  | 1. A sodium vapor lamp is a lamp that uses the element sodium to create light. High pressure lamps contain other substances such as mercury. The bulb has an outer glass shell and an inner arc tube where the sodium and mercury are stored. 2. The arc tube of a high pressure sodium light is generally made out of aluminum oxide, due to its resistance to the high pressure, and xenon, that is used as a starter for the light because it won't react with the other gases. Voltage runs to the light through a ballast, which regulates the current and produces a high voltage to start the sodium and other elements glowing. 3. The arc of gas that extends from one end of the tube to the other is created when ignited, and is made up of metallic sodium and mercury vapor. The temperature of the vapor is controlled by the power supplied to the lamp. With higher power comes higher temperatures and thus higher pressure in the tube, which creates more light. 4. The light that is produced is the result of the electrons in the mercury and sodium being pushed into higher orbits by the high voltage. When they drop back down to their normal or ground state, they emit light at specific frequencies. |

Maintaining a vacuum is difficult, oxygen and other gasses can seep in over f in normal the normal garbage disposal. There have been many cases of garbage trucks catching fire when the bulbs in the back broke. Sodium lamps also contain mercury. The newer LPS lamps contain less mercury than before, but this has performance negatively.